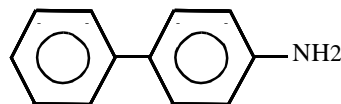


4-AMINOBIPHENYL

4-Aminobiphenyl is a federal hazardous air pollutant and was identified as a toxic air contaminant in April 1993 under AB 2728.

CAS Registry Number: 92-67-1

Molecular Formula: C₁₂H₁₁N



4-Aminobiphenyl is made up of colorless or purple crystals that darken upon oxidation (NTP, 1991). It is slightly soluble in cold water and readily soluble in hot water, non-polar solvents, lipids, ether, alcohol, and chloroform. 4-Aminobiphenyl is volatile with steam (Merck, 1989).

Physical Properties of 4-Aminobiphenyl

Synonyms: p-biphenylamine; 4-biphenylamine; [1,1'-biphenyl]-4-amine; p-aminobiphenyl; p-aminodiphenyl; anilinobenzene; xenylamine

Molecular Weight:	169.22
Boiling Point:	302 °C
Melting Point:	53 °C
Density/Specific Gravity:	1.160 at 20/20 °C
Log Octanol/Water Partition Coefficient:	2.8
Conversion Factor:	1 ppm = 6.92 mg/m ³

(HSDB, 1993; Merck, 1989; Sax, 1987; U.S. EPA, 1994a)

SOURCES AND EMISSIONS

A. Sources

4-Aminobiphenyl currently has no commercial use in the United States. It was formerly used as a rubber antioxidant. It also has been used in the detection of sulfates and as a research chemical. 4-Aminobiphenyl occurs as an impurity in diphenylamine (HSDB, 1993). Mainstream and sidestream smoke were reported to contain 4.6 and 140 nanograms of 4-aminobiphenyl per cigarette, respectively (NTP, 1991).

B. Emissions

No emissions of 4-aminobiphenyl from stationary sources in California were reported, based on data obtained from the Air Toxics “Hot Spots” Program (AB 2588) (ARB, 1997b).

C. Natural Occurrence

No information about the natural occurrence of 4-aminobiphenyl was found in the readily-available literature.

AMBIENT CONCENTRATIONS

No Air Resources Board data exist for ambient concentrations of 4-aminobiphenyl.

INDOOR SOURCES AND CONCENTRATIONS

No information about the indoor sources and concentrations of 4-aminobiphenyl was found in the readily-available literature.

ATMOSPHERIC PERSISTENCE

In the atmosphere, 4-aminobiphenyl can react with photochemically produced hydroxyl (OH) radicals, oxygen, or photolyze. With the estimation method of Kwok and Atkinson (1995), the calculated half-life and lifetime for the reaction of gaseous 4-aminobiphenyl with the OH radical are estimated to be 3.1 hours and 4.5 hours, respectively (Atkinson, 1995).

AB 2588 RISK ASSESSMENT INFORMATION

4-Aminobiphenyl emissions are not reported from stationary sources in California under the AB 2588 program. It is also not listed in the California Air Pollution Control Officers Association Air Toxics “Hot Spots” Program Revised 1992 Risk Assessment Guidelines as having health values (cancer or non-cancer) for use in risk assessments (CAPCOA, 1993).

HEALTH EFFECTS

Probable routes of human exposure to 4-aminobiphenyl are inhalation, ingestion, and dermal contact (NTP, 1991).

Non-Cancer: Human inhalation exposure to 4-aminobiphenyl causes headaches, lethargy, cyanosis, urinary burning, and hematuria. Cystoscopy reveals diffuse hyperemia, edema, and frank sloughing (Sittig, 1991).

The United States Environmental Protection Agency (U.S. EPA) has not established a Reference Concentration (RfC) or an oral Reference Dose (RfD) for 4-aminobiphenyl. Limited information is available on the reproductive and developmental effects of 4-aminobiphenyl. One study showed that 4-aminobiphenyl crossed the placenta in humans and was detected in fetal blood (U.S. EPA, 1994a).

Cancer: 4-Aminobiphenyl is a known human bladder carcinogen. An exposure of only 133 days has been reported to have ultimately resulted in a bladder tumor. The latent period is generally from 15 to 35 years (Sittig, 1991).

The U.S. EPA has not classified 4-aminobiphenyl for carcinogenicity (U.S. EPA, 1994a). The National Toxicology Program (NTP) has classified 4-aminobiphenyl as a known carcinogen based on evidence from human studies (NTP, 1994a). The International Agency for Research on Cancer classifies 4-aminobiphenyl in Group 1: Human carcinogen (IARC, 1987a).

The State of California has determined under Proposition 65 that 4-aminobiphenyl is a carcinogen (CCR, 1996). The inhalation potency factor that has been used as a basis for regulatory action in California is 6.0×10^{-3} (microgram per cubic meter)⁻¹ (OEHHA, 1994). In other words, the potential excess cancer risk for a person exposed over a lifetime to 1 microgram per cubic meter of 4-aminobiphenyl is estimated to be no greater than 6,000 in 1 million. The oral potency factor that has been used as a basis for regulatory action in California is $2.1 \times 10^{+1}$ (milligram per kilogram per day)⁻¹ (OEHHA, 1994).

